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09/821,411	03/29/2001	Haruo Sunakawa	14463	3677

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EXAMINER

MULPURI, SAVITRI

ART UNIT PAPER NUMBER

2812

DATE MAILED: 12/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/821,411

Applicant(s)

SUNAKAWA ET AL.

Examiner

Savitri Mulpuri

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 10-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 1/28/2003.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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### **DETAILED ACTION**

This action is in response to the applicant's affidavits under rule 131 and response to the office action filed on 9/8/2003.

### ***Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness

rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Kneissel et al discloses a method of making GaN based LED structures.; Providing a sapphire substrate '215", growing several device stack layers of AlGaIn, InGaIn 1110, 1420" (see fig. 14 a- 14b); bonding a protective structure comprising metal substrate '1138" covered with soldering material of Ti/Au on one side and metal contact layer on the other side of the metal substrate, wherein layers "1110, 1138,1422" are similar to recited protective layer (fig. 14 b); removing the sapphire substrate by laser irradiation; after removing the sapphire, processing GaN layer surface to Ga material remained on the surface of GaN based stack layers resulted due to removal sapphire ; forming meat contact layer on the GaN based stack layers (see fig 14 c-14 d and related description). Kneissel et al teaches using "1422" as a p-contact electrode, which is similar to the recitation of claim 19.

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Kneissel et al teaches laser irradiation to remove sapphire from GaN layers but does not teach removing the substrate by mixture sulphuric and phosphoric acid at a temperature more than 300

C

Kawai teaches several temperatures in the range of 150 C- 450 C to remove sapphire substrate from the GaN based semiconductor structure (see col. 3, lines 60-63, col.6, lines 50-55) It would have been obvious to one of ordinary skill in the art to remove the sapphire in the invention of Kneissel et al in mixture solution of phosphoric acid and sulphuric acid at 300 C because wet etching as an alternative laser irradiation because wet etching is alternative and art recognized equivalent to laser irradiation to remove the sapphire substrate from GaN based layers.

Applicant's arguments filed on 9/8/2003 have been fully considered but they are not persuasive. Applicant argues that metal substrate "1138" and Ti/Au soldering material shown and described

Kneissel et al are employed for laser irradiation to remove the substrate layer and are not as protective layer. However, metal substrate and Ti/Au soldering layer in the invention of Kneissel et al, as modified by the teaching of Kawai et al, would act as protective layer during etching.

Applicant argues that Kneissel et al teaches, in fig.14c, removing substrate "215" from a semiconductor membrane 1110 by interposing thin GaN layer "1130" between substrate and GaN membrane, wherein ultraviolet decompose the GaN layer "1130". However, invention by Kneissel et al, as modified the teaching Kawai et al, would remove sapphire substrate as similar result as seen Kawai et al. Applicant argues the reaction with respect Kneissel et al but not

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Kneissel et al as modified by the teaching Kawai et al. The inventions both by Kneissel et al Kawai et al is to remove the sapphire substrate, wherein Kneissel removes the sapphire by irradiation and Kawai et al by etching.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Mulpuri whose telephone number is 703-305-5184. The examiner can normally be reached on Mon-Fri from 8 a.m. to 4.30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling, can be reached on (703) 3083325. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

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Any inquiry of a general nature or relating to the status of this application or proceeding should  
be directed to the receptionist whose telephone number is 703-308-0956.

  
SAVITRI MULPURI  
PRIMARY EXAMINER